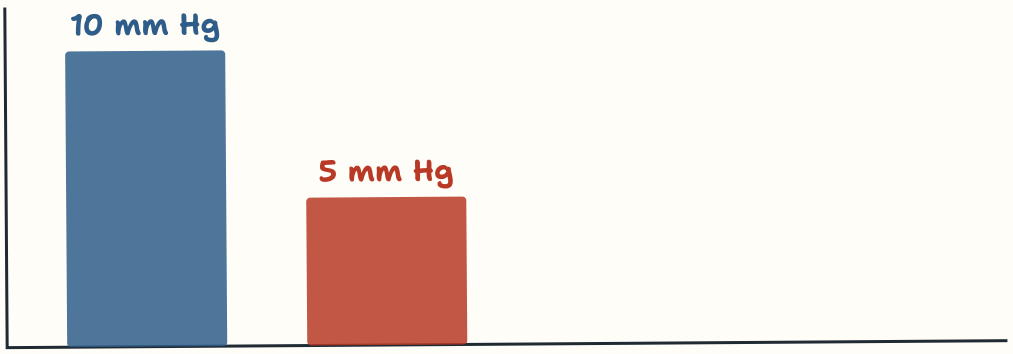
GFR and Starling forces

Net filtration pressure and what moves it



Step by step

1. Capillary pressure pushes fluid out
2. Bowman's space pressure and oncotic pressure push back
3. Subtract both from capillary pressure
4. Multiply by Kf for GFR

Change	GFR
Ureteral obstruction (Bowman's space pressure up)	Falls
Dehydration (capillary pressure down, oncotic up)	Falls
Low plasma albumin, on its own	Rises
Kf lower (less filtering surface)	Falls

What happens to GFR

NET FILTRATION PRESSURE AND GFR

$$NFP = P_{capillary} - P_{Bowman} - \pi_{capillary};\ GFR = K_f \times NFP$$

textbook model: 55 – 15 – 30 = 10 mm Hg; Bowman's space $\pi \approx 0$

Rule of thumb

One force out, two forces back

Oncotic pressure rises along the capillary, so NFP falls: 10 to about 5 (teaching values)

Change one force, hold the rest

Exam traps

- Bowman's space pressure is subtracted, not added.
- A falling Kf lowers GFR even with normal pressures.
- Filtration equilibrium is a rat finding; in humans the pressure profile is not directly measured, so it is an inference.
- The pressures are a common textbook model; published values vary.

GFR and Starling forces at the glomerulus

Video, written lesson, practice question and sources: medservatory.com/usmle-step-1/renal-physiology/gfr-starling-forces-glomerulus

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